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AUTHOR Anderson, Lowell D.
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ABSTRACT

With increased global competition, it is imperative that secondary school programs be reformed so as to be able to turn out productive workers having basic skills in reading, writing, and mathematics and the ability to solve problems and learn new information. One proposed reform, tech prep, can be defined as a technical education alternative to the college preparatory program articulated with a two-year postsecondary associate degree program. The tech prep program should run parallel to the college preparatory program, it should build an advanced skills technical education, and it should incorporate real-life applications of the curriculum using a competency-based approach designed to provide employability skills. Many different models of tech prep have been proposed, such as the Center for Occupational Research and Development's Tech Prep/Associate Degree program, which encompasses kindergarten through lifelong learning; the Perkins Act model; and the Indiana model. Several delivery systems for tech prep can be synthesized from these approaches. Although technology education would be assumed to be a part of tech prep, the literature does not support this position. Therefore, technology educators must make an aggressive effort to be included in tech prep. Nine propositions for the relationship of technology education to tech prep should be considered as the tech prep model is developed. (Contains 26 references.) (KC)

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RELATIONSHIP OF TECHNOLOGY EDUCATION TO TECH PREP

Presentation to the

Mississippi Valley Industrial Teacher Education

79th Annual Conference
Chicago, Illinois

Session II: Goals and Objectives of Technology Education in the Schools

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by

Dr. Lowell D. Anderson
Indiana State University

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November 1992

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Authorship

This paper is in part based on a paper proposed for publication to the International Technology Education Asscciation and the Technology Education Division of the American Vocational Association by Dr. Lowell D. Anderson and Dr. Ahmed Sabie.

Dr. Sabie is the Director of Tech Prep for the State of Kentucky. Prior to this position he served as the supervisor of Industrial Technology Education programs for the Division of Curriculum Services and Staff Development for the St. Louis Public Schools.

An advisory committee was used in the development of the original paper. This committee was composed of seven professionals serving in various capacities from state departments, secondary school administrators, counselor, and technology teachers. Their advice was essential to development of the document.

However, this paper is the authorship of Dr. Lowell D. Anderson and may not always reflect the same interpretation of information given in the proposed paper Critical Interrelationships for Technology Education: Principles of Technology, Tech Prep, Integrated Academics.

Introduction

My first caveat in presenting this paper to the membership of the Mississippi Valley Industrial Teacher Education Conference is that the more critical and exciting issue facing technology education is probably not defining our relationship with tech prep but defining our role as a profession in the process of educational **restructuring** of the system as we currently know it. In my opinion, tech prep is only one evolutionary step in the agenda of restructuring and reforming education.

Restructuring and reforming are terms used to define the process of examining every component at every level of the education system in the United States intending to recreate a more responsive and effective system to educate youth in meeting the needs of society. This process of critical examination is intended to root out perceived barriers which frustrate the effectiveness of the current system. Barriers can include regulations defining organization, administration, subject time allocation, curriculum, teacher education, instructional methodology, teacher licensing and certification, funding, graduation requirements, relations between different education organizations, and community involvement.

Key questions asked at the classroom level (David, 1991) in the process of restructuring are:

* What do we want students to know and be able to do as a result of restructuring ?

* What kinds of learning experience produce these outcomes ?

* What does it take to transform schools into places where this can happen?

* Who is responsible for ensuring that the desired results are achieved ?

However, based on my assignment to examine the relationship of technology education to Tech Prep, I shall focus on that topic. In order to more effectively answer the question it seems essential that a premise be established for our concern about the education system in the United States.

Political agenda. Restructuring is at least in part based on the political agenda of the Republican party defined in part in documents such as A Nation At Risk (1983). This was the first part of a carefully designed plan

intending to focus the attention of society on the issue of education reform. This was just one of many papers released over the past decade by government and education committees calling for reform. The results of these reports was a series of proposals which struck at the heart of education questioning its core from preparation of teachers, achievement testing with national standards to organizational structure at all levels.

President Bush (1991) continued this agenda in presenting the program, American 200: An Education Strategy defining six comprehensive educational goals designed to improve the secondary school. These goals are somewhat like apple pie; "Who could possibly disagree with education for all, success in mathematics and science, drug free and violent free schools, and the preparation of every adult to be able to compete in a workforce designed to maintain our role in a global economy?"

Secretary of Labor, Lynn Martin (July 2, 1991) released the report What Work Requires of Schools: A Scans Report for America 2000. The comprehensive recommendations for basic skill development centered on five competencies. These competencies were not a new revelation on education. But, a more important implication of this report, critical to technology educators, was the recommendation by the Department of Labor that many areas of education defined as preparation for work in the secondary school be placed under the auspices of the Department of Labor. Administration and funding of programs was to be implemented through the structure created by the Job Training Partnership Act (JTPA). This would provide the necessary local administrative unit, Private Industry Council, (PIC) to oversee programs and expenditure of funds. It would also combine current functions defined in the JTPA Act with vocational education and post-secondary technical education.

Vouchers, choice, and privatization. It seems that a consistent and planned process of decreasing the role of the public education system has been part of the agenda for more than a decade. The strategy has included diminishing the role of schools of education at the universities, arousal of public concern that secondary schools are ineffective in educating youth, and promoting choice as an opportunity for parental selection of quality education. Choice, through a voucher system, supports public education but more important opened a direct avenue for funding private education. Vouchers could provide an alternative to forced integration undermining affirmative action legislation, not responding to the inequalities of funding between rich and poor school corporations, and decreasing the ability of a comprehensive public school system to operate. The results could be the

creation of a dual system of private schools and public schools similar to education systems found in other countries. Public education is allocated to the general public with a small fee required for the private. This effectively creates a caste system in society.

Keith Geiger, NEA President (November 1992) writes,

> Consider: Just last year, the Bush Administration issued a proposal that would permit $6.2 billion in Chapter I funds to be used as vouchers at private schools, remove $530 million dollars from public treasury as a gift to private and parochial schools, and use $225 million in education block grants to encourage choice programs. (p. 2)

These proposals could hardly be identified as business as usual.

AIT and CORD. State and federal funding of private agencies for purposes of evaluating and developing curriculum for education is not new. However the privatization concept probably reached a high point during the development of Principles of Technology and Tech Prep by the two nonprofit organizations Agency for Instructional Technology in Indiana and the Center for Occupational Research and Development in Texas.

The development of Principles of Technology (PT) was a cooperative venture involving two major nonprofit agencies. The Agency for Instructional Technology (AIT) and The Center for Occupational Research and Development (CORD) working in a consortium receiving funds from 43 states and Canadian provinces. The initial funding for this 1984-85 venture was provided through state vocational education agencies costing $2,750,000. (Agency for Instructional Development and the Center for Occupational Research and Development, no page given in brochure)

Tech Prep is primarily a development of these two public supported agencies. Dan Hull, president of CORD and Dale Parnell, President and Chief Executive Officer of the American Association of Community and Junior Colleges became the key people responsible for conceptualization and implementation of Tech Prep. The goals of Tech Prep are consistent with those advocated by Dale Parnell as Superintendent of Public Instruction in Oregon. In 1969 he proposed that schools should focus on the non-baccalaureate-bound student and that the secondary school curriculum should tie the career goals of the student to the curriculum. (Parnell, 1969)

Dale Parnell (1985) The Neglected Majority sharpened the focus for reform through identification of the failure of the secondary schools to meet the needs of students in the middle 50 percent of the population. (p. xi) The focus was on changes needed in learning style, curriculum, program organization and instructional methodology. These propositions were closely aligned with the efforts of Dan Hull of CORD in the development of the Unified Technical Concepts (UTC) and the 1985 development of Principles of Technology. (Agency for Instructional Technology, 1985, p. 5)

The impact of these efforts in private enterprise when applied to public education had some of the effect of removing curriculum design and teacher education away from the universities and schools/colleges of education. These developmental processes were contracted in public supported not-for-profit organizations. Conceptually, it was anticipated, that these organizations would be able to sell services to secondary schools providing the necessary capital for innovation with limited dependence on state and federal tax monies. In effect, the local school corporation which could afford to purchase services would become the more innovative. A form of non-egalitarian free enterprise.

The result of these efforts has been the development of a major reform effort of the secondary system with limited input from higher education. It has also resulted in financial problems for local school corporations operating on a low tax base needing to purchase curriculum materials and services from private enterprise.

Free public education. A key to any legitimate discussion on education in the United States is an understanding and compassion for the hard fought battles won to make available free public education for all students. Historically this system of education differentiated us from most other countries in the world.

Cubberley (1919) in reporting on this difficult period from 1825 to 1850 in our country during which one primary concern was providing a common school education for all children at public expense. (p. 119) This was one of the most difficult periods in the development of our country. He compared the question of free public education to

> Excepting the battle for abolition of slavery, perhaps no question has ever been before the American people for settlement which caused so much feeling or aroused such bitter antagonisms. (p. 119)

Similarly, in our profession, the hard fought battles of including industrial education in the public school curriculum was a primary objective of the National Society for the Promotion of Industrial Education (Barlow, p. 17-20). One can sense in reading The Unconquerable Senator Page (1976) the struggles for inclusion of industrial education in the public sector rather than under the direction of the Department of Labor and Industry. At the same time the critical need for a federal act to support continued development of these programs was to be accomplished.

> Our system of public education (Geiger, 1992) rests on the premise that the education of America's children is not only a moral responsibility, but also a national investment. It is an investment in our economy, an investment in our democracy, an investment in the noblest ideals of our heritage. (p. 2)

This support of a public education system for all providing quality and equal education has been under attack during the past decade. To me, quality education for all, paid through public taxation is essential to our democratic ideals.

Goals of Restructuring

America 2000: An Education Strategy (1991) released through the U.S. Department of Education with introductory statements from President Bush and Secretary of Education Lamar Alexander is probably the most definitive statement for the direction of education during the remaining years of this decade. It is premised on a need to restructure and reform the American education system to meet the standards of a world class educational system.

The goals of America 2000 are that:

> Goal I: By the year 2000, all children in America will start school ready to learn.
>
> Goal 2: By the year 2000, the high school graduation rate will increase to at least 90 percent.
>
> Goal 3: By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared

for responsible citizenship, further learning, and productive employment in our modern economy.

Goal 4: By the year of 2000, U.S. students will be first in the world in science and mathematics achievement.

Goal 5: By the year of 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

Goal 6: By the year of 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning. (p 35-40)

Accomplishment of these goals in a short 8 years will take a tremendous effort. However exactly what is to be done is not especially clear. The role of the federal government, using limited funds, will be to set standards but act in a "pushing and prodding" manner to urge on the restructuring process. A few specifics on what this restructuring means are:

* standardized testing programs;
* choice programs;
* academies for teachers and administrators;
* differentiated teacher pay;
* alternative teacher certification and licensing;
* merit schools;
* business leaders as key on design teams;
* grass roots involvement; and,
* restructuring schools. (U.S. Department of Education, 1991)

Ignoring the efforts of the U.S. Department of Labor to influence the direction of education would cause one to not comprehend the total picture. Critical documents which have been published are Workforce 2000: Work and Workers for the 21st Century (Johnston,1987) Work-Based Learning: Training America's Workers (Van Erden, U.S. Department of Labor, 1989) Investing in People: A Strategy to Address America's Workforce Crisis (Schubert, Commission on Workforce Quality and Labor Market Efficiency, 1989) and, What Work Requires of Schools: A Scans Report for America 2000 (The Secretary's Commission on Achieving Necessary Skills U.S. Department of Labor, 1991). In brief the issue address is the preparation of workers for the job market. The issue is the role of the Department of Labor in influencing curriculum and structure in the secondary school

to better prepare that worker needed for a "World-Class Workforce".

If one reviews the two major thrusts of these documents coming from the Department of Education and the Department of Labor, one would conclude that both seek a reform through restructuring the organization and redefining the goals of the secondary schools. However the philosophical issue proposed separates between the issue of academic achievement in the conventional sense and the more direct career and work preparation. The outcome setting direction could depend on the influence of the department of labor or the department of education. Apparently, if the country's most critical issue is the preparation of a **world class workforce** then programs which most directly address the preparation of a highly skilled worker will result from these efforts or restructuring.

Societal Factors Supporting Reform

The recommendation for school reform is premised on more than political ambitions. Reform is also based on at least three societal issues (1) the increased economic and education problems faced by the middle sector of the population, (2) the role of the United States in a global economy, and (3) the education of a "world-class" workforce. Examination of each of these issues provides ammunition for advocating the reform and restructuring of the education system.

Neglected majority. The William T. Grant Foundation (1988) Commission on Work, Family and Citizenship final report The Forgotten Half: Pathways to Success for America's Youth and Young Families clearly identifies the population which is being addressed.

> Succinctly, "Who are the Forgotten Half?" In nonstatistical terms, they are the young people who build our homes, drive our buses, repair our automobiles, fix our televisions, maintain and serve our offices, schools, and hospitals, and keep the production lines of our mills and factories moving. To a great extent, they determine how well the American family, economy, and democracy functions. They are the thousands of young men and women who aspire to work productively; but, never quite "make it" to that kind of employment. For these members of the Forgotten Half, their lives as adults start in the economic limbo of unemployment, part-time jobs, and poverty wages. Many of them never break free. (p. 1)

Statistically, this segment of the population can be

defined from the perspectives of economics, family life, education, and job potential. They are:

* the young families who from 1973 to 86 lost over one quarter of their real income and fared far worse than any other age group in the United States; (p. 17)

* the minority and female-headed young families earned less and fared far worse than other Americans; (p. 19)

* the young families experienced a poverty rate that almost doubled from 1967 to 1986: (p. 21)

* the young males who are frequently the economic provider of the family found it increasingly difficult to earn at above the three-person poverty level; (p. 24)

* the high school drop-outs who earn less and are less likely to hold jobs or are married living with their spouses than high school graduates: (p. 25)

* the individuals who have experienced a real mean annual decrease in earnings of 25.8 percent for males age 20-24 from 1973 to 1986 if a high school graduate; but, 42 percent if they are not high school graduates. Earnings for students with some college credit has decreased by 16 percent and for college graduates 6 percent. (p. 27)

Dale Parnell in The Neglected Majority (1985) identified this same population as the 60 to 70 percent of the school population that ". . .will not likely pursue a baccalaureate-degree program." (p. xi) The Neglected Majority became the single most quoted book providing a rationale for reform and for Tech Prep. It focused the attention of program reform on the middle fifty percent of the school population.

Parnell pulls no punches; his primary objective is clear. The book,

> . . . throws the spotlight upon real-life people called "ordinary students" and upon how high schools and community colleges might work together on behalf of these middle quartile of students. The non-baccalaureate-degree students deserve and need an excellent education. . . (p. 171)

The premise being that the neglected majority are those students who by-and-large are in the general education

program and who are the **unfocused learners**. These students will profit from programs which have defined goals demanding excellence in the academic subjects taught through an applied methodology. Programs need to be planned through grades 11 and 12 and articulated with two year postsecondary programs. (p.40)

Parnell interprets the message coming from the community, politicians, and policymakers as;

> "Give us more structure; give us more substance in our education programs. Help us develop the confidence that the materials and scaffolding of our educational structures match real-life needs of all our students [italics in original]." (p. 133)

This is the message that Parnell responds to and is also the message commonly heard from those advocating reform.

The United States in a Global Economy. Robert B. Reich (1991) The Work of Nations: Preparing Ourselves for 21st Century Capitalism postulates that the most critical issue facing the United States is our ability to respond to the new global economy. He says that the economic transformations will ". . . rearrange the politics and economics of the coming century." (p. 3) It will remove national [italics in original] products or technologies, national corporations, and national industries. In its place will be global organizations functioning beyond the historical national boundaries.

Anthony P. Carnevale (1991) in America and the New Economy projects major changes. One of these is the concept of productivity. He states that productivity is not the key issue in world competition. Productivity is ". . . still a necessary condition for competitive success, but no longer sufficient by itself. . ." (p. 15) The consumer has become the key force in the market.

The reasons for this change include:

* increased wealth of nations;
* globalization of economic activity;
* diversification of taste;
* increased value of human time;
* commercialization of free labor;
* increased influence of consumers; and,
* technical advances. (p. 15)

World class workforce. The training of the workforce is currently more than a $30 billion annual corporate and government investment and will projectively become larger in

the future. In recent comparisons on the productivity of the American worker to Japan and German workers the average American worker produced $45,100 worth of goods and services in 1990 as compared to $37,850 for German workers, and $34,500 for the average Japanese worker. (Stewart, 1992)

Both presidential candidates Bush and Clinton have proposed workforce development programs if elected. (U.S News & World Report, 1992) Bush advocates a voucher system paid at $3,000 per worker to 400,000 workers. Clinton would assess firms of more than 100 employees to spend 1.5 percent of their payroll on training or pay those unspent funds into a training fund.

A common perception held by many industrialists on the education system's ability to meet the needs of industry is:

> Yet America's primary and secondary schools continue to produce young adults ill-equipped to perform even basic educational and occupational tasks. And most American employers do not consider worker training to be a corporate imperative. With Germany, Japan, and other countries running circles around the U.S. in education and training, and with the likes of Thailand, China, and Mexico underbidding us on wages, one question looms largest for the U.S,: What are we-as individuals and as a nation- going to do for a living? (Henkoff, p. 58)

Henkoff is of the opinion that the best way to encourage the growth of high-wage jobs is through the upgrading of the skills and knowledge of the worker. Based on studies by the American Society for Training and Development every $1 spent on training generates $3 in new economic activity. (p. 60)

Summary. The focus on reform of the school program for the middle population of the secondary school is premised on the United States maintaining the competitive edge in the world economy. The concern is a productive workers having basic skills in reading, writing and arithmetic with the ability to solve problems and learn new information. Attention is not only given the secondary and postsecondary two year programs but also the worker currently employed in industry. The consequences of failing to co-opt our youth into the economic system has tremendous social and economic implications for our country.

A Definition of Tech Prep

Defining Tech Prep reminds me of our previous difficulties in defining Career Education. Both program concepts have evolved from several guiding principles;

legislation and a set of deep-seated feelings. Many of these feelings are reactive, some innovative, but are generally founded on a commitment to improve the education of youth. Tech Prep is not the only term, others such as integrated academics and applied academics are equally difficult to define but these reforms are taking root in the restructuring of programs in the school.

The two most definitive sources on Tech Prep are (Hull and Parnell, 1991) the book Tech Prep Associate Degree: A Win/Win Experience and Part E of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990.

CORD definition of Tech Prep. Initial efforts by CORD in program design to meet the needs of engineers and specialized technicians was in 1979-80. The response was to design a two year program for community and technical colleges too prepare engineering technicians for new and emerging technologies. (Hull and Parnell, p. 37-38) The problem encountered by CORD in implementing programs was the lack of an adequate background in mathematics, science and English skills of graduates of high school programs.

Thus in redefining tech prep (Hull & Parnell, 1991) state:

> The Tech Prep/ Associate Degree program is a technical-education alternative to the time-honored college prep/baccalaureate degree program. Tech prep is targeted for--but not limited to--"general education" high-school students (the forgotten half) who think, reason, and learn much better in concrete terms than in abstract mode as presented in most liberal arts programs. Thus, TPAD rests on the foundation of applied academics--incorporating real-life applications and hands-on experience into the teaching of academic subjects. (p. 4)

In order for a curriculum to qualify as a TPAD curriculum it should:

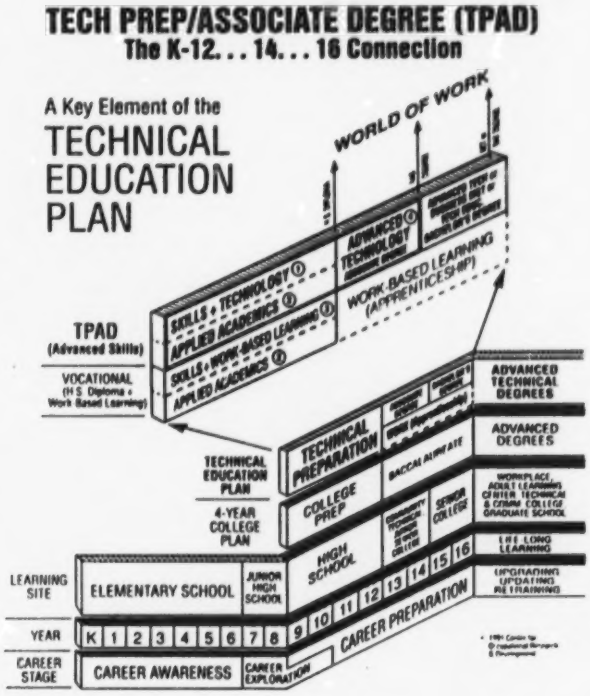
* run parallel to--not replace--college prep/baccalaureate degree programs;
* build an advanced-skills technical education on a common foundation of math, science, communications, and social sciences;
* lead to an associate degree or two-year certificate;
* incorporate relevant (real-life) applications of what is being taught--in other words, be built around

applied academics;

* use a competency-based core curriculum structured around a career cluster of occupations; and,

* provide employable skills at the conclusion of the high-school portion, so that, if circumstances require, students can work while completing their associate degree. (p. 47)

TP/AD MODEL. The CORD TP/AD model is conceptually organized from kindergarten through life-long learning. Key to understanding the model is that the general education component of the secondary program has been eliminated. In its place is the technical education plan starting in grade



From Tech Prep Associate Degree: A Win/Win Experience. (p.xx) by Dan Hull and Dale Parnell, (1991), Waco, TX: Center for Occupational Research and Development. Reprinted by permission.

nine. Technical preparation includes two organizational structure (1) vocational high school including skills and work based learning with applied academics, and (2) TPAD

which is a 2 + 2 model including skills and technology with applied academics. The 2 years of postsecondary would include advanced technology leading to an associate degree. The model creates a two track system of technical preparation or college preparation in the high school.

Perkins definition of Tech Prep. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (American Vocational Association, 1990) is the major federal legislation supporting Tech Prep. This federal legislation is in effect from 1991 through 1995. Part E, Sections 341-347 establishes the guidelines which must be met if the program is to be funded. Section 344 delineates the contents of the program which are:

1. programs must be carried out under an articulation agreement with 2 years of high school and 2 years of postsecondary education or apprenticeship;

2. that a common core of required proficiency in mathematics, science, communications, and technologies designed to lead to an associate degree or certificate in a specific career field must designed into the program;

3. the curriculum must be appropriate to the needs of the consortium participants. Consortium participants means members of the planning committee including the community or technical college, secondary school and industrial representatives;

4. that training programs must be available for counselors focusing on recruitment and career advising; and,

5. that provision must be made for special populations in technical fields. (p. 100)

The Act does not define the actual meaning of Tech Prep. It only provides some guidelines which must be met to qualify for federal funds. Implementors of Tech Prep are obligated to design programs which meet those guidelines.

Indiana defines Tech Prep. Indiana legislators passed P.L. 217 (May 1, 1987) to amend Indiana Code concerning vocational education. The purpose of this legislation was to create a task force to design and approve technology preparation curriculum models. Criteria for approval of the Indiana Model was that it:

1. be performance based;
2. provide students with the skills necessary to gain

employment or pursue further education upon graduation;
3. relate to a broad scope of occupational opportunities;
4. include math, science, and English/language arts courses, taught through practical application and designed to meet graduation requirements for those subjects;
5. be designed to include secondary and postsecondary sequence models; and
6. allow for dual credit, advanced study, and cooperative agreements.

The Indiana Department of Education produced a pamphlet (1990) Technology Preparation Curriculum: Why Tech Prep, Background, Guidelines for Tech Prep, What is Tech Prep, Technology Preparation Curriculum attempting to answer the many questions in the state on program and implementation. The target population of this program is specifically high school students in the general studies curriculum. The purpose of the program was to provide the necessary foundation for students who will be working and living in a complex technological world.

Features of the program include:

1. a secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness taught through practical applications;

2. an articulated secondary-postsecondary curriculum;

3. multiple entry points;

4. team teaching and/or joint instructional planning across areas of instruction;

5. teaching strategies which include applications-based instruction, interdisciplinary instruction and cooperative learning;

6. learning activities which emphasize problem-solving critical thinking skills, teamwork, and cooperative learning;

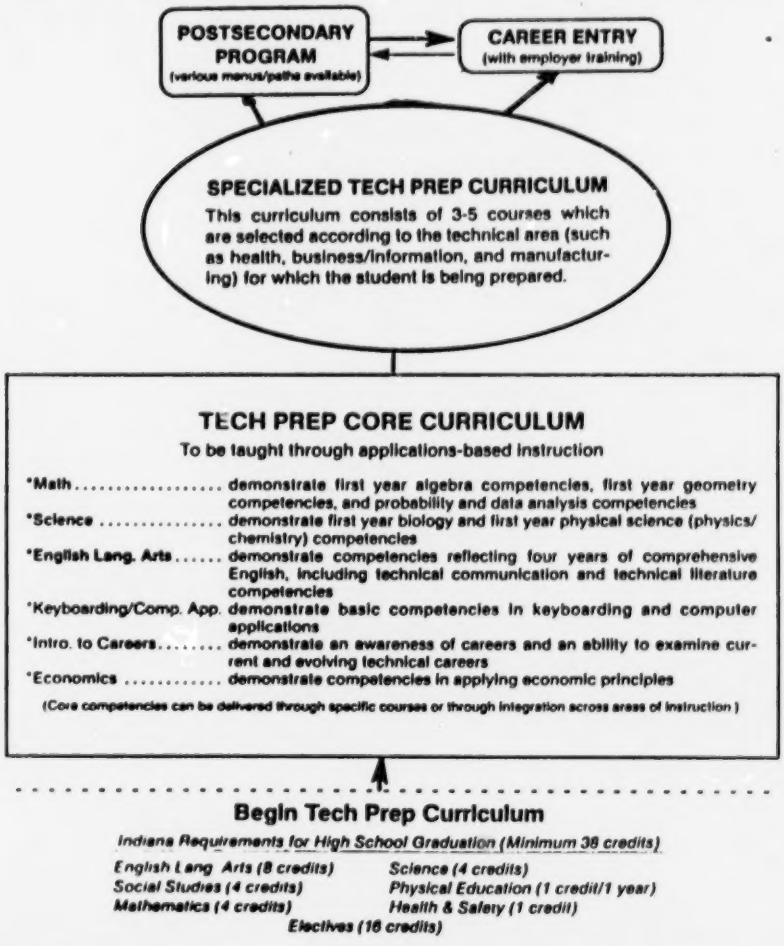
7. courses that are designed to promote mastery by being performance based;

8. core competencies delivered through specific courses or through integration across areas of instruction; and,

9. locally determined recommendations for electives.

Indiana model. The concept presented in the modal is composed of two major components (1) Tech Prep core curriculum of academic subjects taught through applications based instruction and (2) a specialized tech prep curriculum. The specialized curriculum is to be consistent with the objectives of the student such as courses in technical areas, business areas, health and manufacturing.

TECHNOLOGY PREPARATION CURRICULUM MODEL FOR INDIANA


POSTSECONDARY PROGRAM
(various menus/paths available)
CAREER ENTRY
(with employer training)
SPECIALIZED TECH PREP CURRICULUM
This curriculum consists of 3-5 courses which are selected according to the technical area (such as health, business/information, and manufacturing) for which the student is being prepared.
TECH PREP CORE CURRICULUM
To be taught through applications-based instruction
*Math ..... demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies
*Science ..... demonstrate first year biology and first year physical science (physics/chemistry) competencies
*English Lang. Arts ..... demonstrate competencies reflecting four years of comprehensive English, including technical communication and technical literature competencies
*Keyboarding/Comp. App. demonstrate basic competencies in keyboarding and computer applications
*Intro. to Careers ..... demonstrate an awareness of careers and an ability to examine current and evolving technical careers
*Economics ..... demonstrate competencies in applying economic principles
(Core competencies can be delivered through specific courses or through integration across areas of instruction)
Begin Tech Prep Curriculum
Indiana Requirements for High School Graduation (Minimum 36 credits)
English Lang Arts (8 credits)
Social Studies (4 credits)
Mathematics (4 credits)
Science (4 credits)
Physical Education (1 credit/1 year)
Health & Safety (1 credit)
Electives (16 credits)

Reprinted from the Indiana Department of Education pamphlet Technology Preparation Curriculum: Why Tech Prep, Background, Guidelines for Tech Prep, What is Tech Prep, Technology Preparation Curriculum. (1990) Indianapolis, IN.

South Vigo High School defines Tech Prep. Indiana selected five demonstration sites for development and field testing of Tech Prep concepts. These sites served as potential models and sources of information to other schools seeking to implement programs. The demonstration schools had programs/courses which ranged from cooperative vocational education, integrated academics, school-within-a-school, and a course in tech prep. Most programs involved technology education or industrial arts however one site did not involve either vocational or technology education subjects. One site interpreted Tech Prep to be primarily a cooperative work experience program.

South Vigo High School was not a demonstration site and was experiencing enrolment problems in both the conventional vocational subjects and industrial arts/technology education subjects. In response to this problem the program **INTEGRATED ACADEMIC/TECHNICAL CURRICULUM** was developed and is in the second year of implementation.

The mission statement (Martin, 1990) of this program recognized the problems of current programs in the secondary school in meeting the needs of students through the general education portion of the school program. A key portion of the mission statement is the call for

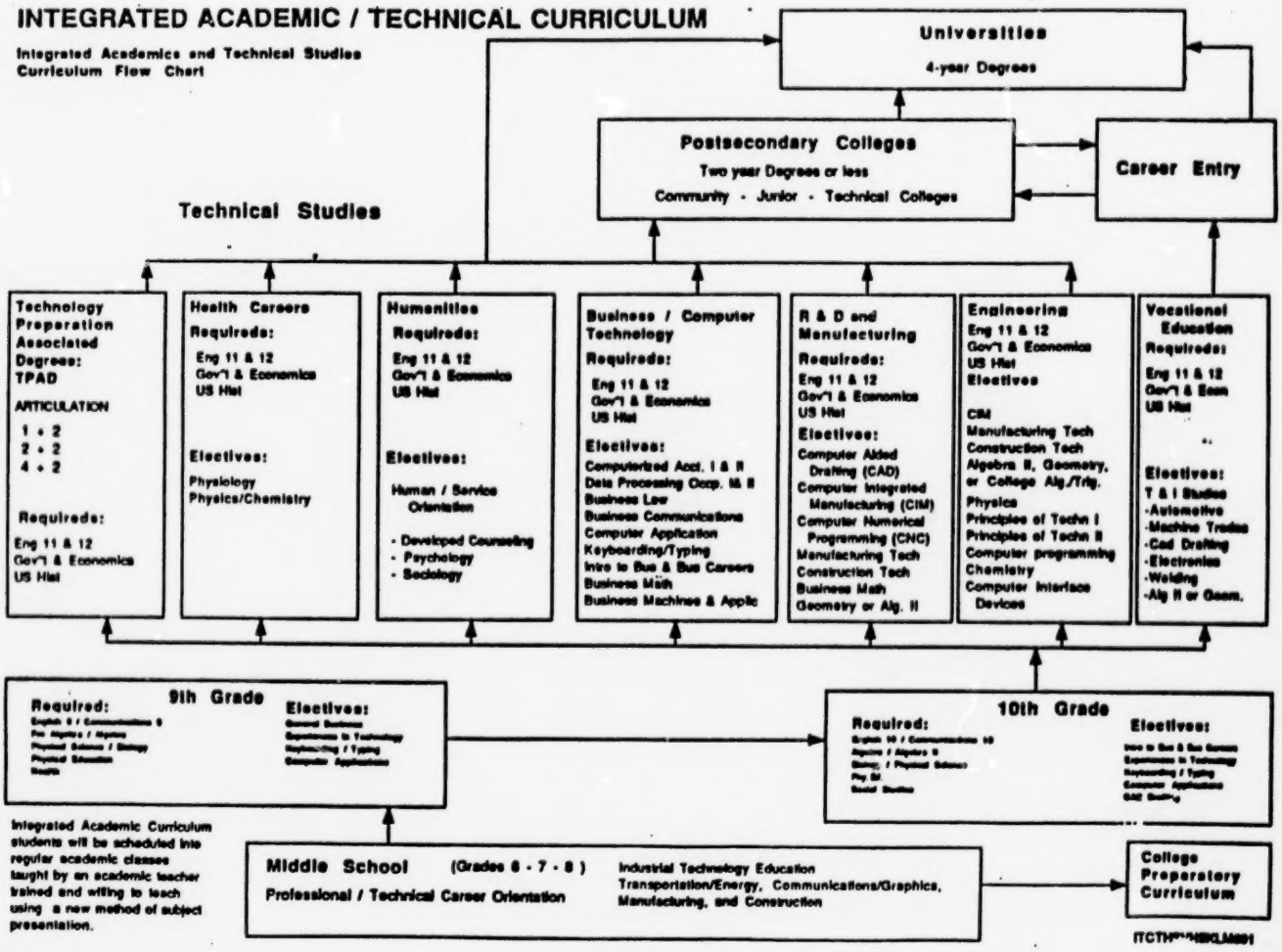
> A balanced 'Hi-Tech' based learning activity curriculum that develops broad based transferable skills as well as technical skills is needed. A closer relationship between academics and the world of work needs to be established.

Implementation of this program has required extensive remodeling of the laboratory facilities and the purchasing new equipment. The instructional facility design promotes the use of instructional modules and small group problem solving. The lecture room organization has disappeared. Equipment includes extensive use of computers, robotics, modules in electronics, aircraft flight and similar packages. None of the equipment is production models common to industry. A materials and process laboratory is being developed which will permit extensive use of the more conventional equipment.

The goals of the program are:

1. Integrate academic and technical education in order that students may apply what they are learning for real life experiences. Provide students an opportunity to apply their experiences in English,

SOUTH VIGO HIGH SCHOOL
MODEL



math, science and other areas to today's technology through a broad-base of technical concepts and activities.

2. Improve working relationships between school, industry, and business to utilize each one's expertise in fulfilling secondary students' future needs. Organize advisory and working committees to give breath to curriculum planning and organization.

3. Develop active articulation between middle/junior high school and postsecondary institutions that will best prepare people for high tech careers without course duplication. Use state and national professional organizations wisely.

4. Establish and monitor a technical curriculum increasing every students' educational performance and achievement for both employment and further education.

5. Strengthen staff competencies for delivering the technical teaching needed for today's "high tech" demands.

6. Plan and secure appropriate equipment, room arrangement and facilities.

7. Determine procedures for financing new curriculum endeavors.

8. Sell the new curriculum to the public and current student body. (Martin, Technical Curriculum for Twenty-First Century Living)

The student population which this program addresses is the middle 50 percent. It is the intent of the school to have the Integrated Academic/Technical Curriculum replace the current general education curriculum. In the projected future approximately 50 percent of the students in the school should be enrolled in this program. An indication of the success of this program was the increase enrollment from 240 to over 700 students after one year of operation.

The model includes the two primary components of a core of applied academics and specialization areas. Tech Prep becomes one section of the total program with a broad range of occupational clusters. Vocational education remains as a primary area of instruction but is relegated to one section of the total program. Career entry is the only option available to the student graduating from the vocational program. All other programs provide the dual

option of advanced education or career entry.

Synthesizing three models and the Perkins Act. The three models for Tech Prep including; (1) CORD, (2) Indiana Department of Education, and (3) South Vigo High School plus the Perkins Vocational Education Act should serve to provide some reasonable listing of criteria for defining Tech Prep. These are:

1. A core of applied academics of at least mathematics, science, English and economics is required.

2. A specialization core in one of several occupational clusters having a high technical information base is required.

3. Articulation agreements with postsecondary institutions are required.

4. Instructional methodology must use applied concepts, should be team taught and interdisciplinary in design.

5. Instructional organization should emphasize problem-solving, transfer of learning, critical thinking, and be performance based.

6. Technology education, industrial arts and vocational education are not required to meet the definition.

7. Tech Prep can be a course or a program.

8. The student population addressed is the middle 50 percent who are currently enrolled in the non-directed general education program.

9. The program must provide for career entry and/or continued education.

Program delivery strategies. One of the variables concerning Tech Prep is the organization which can, or is, used to deliver the concept. This same problem of defining delivery models exists for integrated academics with vocational subjects. No specific model, no specific goals for integration or approaches to accomplish the task have been identified. (Stasz and Grubb, 1991; Grubb, Davis, & Lum, 1991).

Eight models (program delivery strategies) were synthesized from research which provide classification for programs involving integration of several disciplines around a new program concept. These are:

Model 1 Incorporate academic content in vocational courses

Model 2 Combining academic and vocational teachers to enhance competencies in vocational programs

Model 3 Make academic curriculum more vocationally relevant

Model 4 Modification of academic and vocational curriculum using more occupationally relevant curriculum in both curricula

Model 5 Senior projects to integrate learning.

Model 6 Schools-within-schools or academies which integrate and serve a specific population of students

Model 7 "Magnet" or curriculum-focused schools which have been organized around a central theme and create a type of culture

Model 8 Reorganization of the curriculum around "Clusters of Occupations" (pp iii-vi)

In visiting a number of schools that are involved in Tech Prep all eight of the previous models or parts of those models can be observed. The major difference between integrated academics is that it is most frequently used to designate vocational subjects with academic subjects. Tech Prep can function in the school without vocational subjects or technology education. Applied academics and Principles of Technology are examples of programs which can serve as the core program for Tech Prep, or in some instances, are the Tech Prep program.

The models which best describe the current relationship between Tech Prep and technology education range from integrated programs with academics through single courses usually in manufacturing or CAD drafting. Programs that are currently being taught having a **high technical content** may be neither technology education nor conventional industrial arts. The South Vigo model and two of the demonstration programs have been identified as not being technology education, industrial arts or vocational technical. However they are identified as being a part of Tech Prep.

The several identifiable delivery models are:

Model A Program areas such as Manufacturing or

Communications (primarily CAD drafting) or Electronics and Controls taught as specialization for Tech Prep;

Model B An integrated program taught by academic and technology or vocational teachers using a thematic curriculum design such as manufacturing, product design and marketing, communications involving teachers from various disciplines working as a planning team;

Model C A separate course or courses taught in support of Tech Prep such as Introduction to Computers, Introduction to Engineering or Introduction to Industrial Engineering are taught quite removed from the academic courses.

Model D A combination of separate courses, introductory courses and integrated thematic curriculum all defined as a portion of a larger Tech Prep program.

These models can be used as the total program for the middle 50 percent of the school population or as a school-within-a-school or a magnet school concept. The extent to which a school intends to implement Tech Prep is usually a result of many influencing factors in the decision process.

The key to delivery is to understand and apply the guidelines for Tech Prep used to determine if the program is eligible for funding. These guidelines provide considerable latitude in both planning and delivering programs. The amount of autonomy given the local school provides for considerable innovation. Every delivery model could reflect one local school district and need not be replicated in another district.

Suppositions About Tech Prep

One problem in the current reform movement is being able to define with any clarity the guidelines and goals of the movement. Stasz and Grubb (1991) summed up the dilemma in the title of their report Integrated Academic and Vocational Education: Guidelines for Assessing A Fuzzy Reform. The found that it could mean (1) alignment of the curriculum to include both more academic and more applied curriculum, or (2) applied which could me using some of the off-the-shelf curriculum material on the market, or (3) integration by changing the organizational structure and developing clusters of content and delivery systems.

In lieu of having explicit guidelines, the following suppositions are made to provide some direction to the current process of reform. These are:

Supposition I The primary goal of reform is the restructuring of the current system of public education including curriculum, instructional methodology, administration and funding at the state, local and national level.

Supposition II The program patterns of the secondary high school will include two tracks one being college prep and the other **technical preparation.**

Supposition III General education in the secondary school will be eliminated with a program having a career oriented set of goals leading to advanced education or job entry.

Supposition IV Articulation agreements will continue to be developed between secondary Tech Prep programs and two year postsecondary programs.

Supposition V Instructional methodology will require application of principles found in academic studies but taught through the technologies.

Supposition VI Restructuring will not require a new set of programs but will demand innovative use of existing curriculum and courses.

Supposition VII Performance based instruction and evaluation will be required with each student developing a personal education plan which will need to be monitored.

Supposition VIII A closer relationship will be formulated between the community including parents, social agencies and business. Apprenticeship models will be a critical portion of this linking between school and the workforce.

Relationship of Technology Education to Tech Prep

Generally one would surmise that technology education is at the very center of the concept of Tech Prep. After all the literature is full of examples of integrating academic subjects into technology and vis-versa. At the same time no other discipline in the school teaches about technology in a applied methodology using a laboratory environment. At the same time we have always maintained that we are an integral and critical part of the general education curriculum. However the literature does not identify technology education as part of Tech Prep. It also ignores the

vocational subjects. In short technology education must take a very aggressive posture if it is to be included in the concepts of Tech Prep.

The following propositions are made to define the relationship of technology education with Tech Prep and warrant consideration:

Proposition I The most successful tech prep programs have used the **high technical** portion of information in technology depending upon equipment which has considerable information embedded in the design. These programs may not meet the current definition of technology education or industrial technology education.

Proposition II Instructional methodology must involve integration of academics, team teaching, modularization of instruction and emphasis on discovery and problem solving.

Proposition III The current four or five systems organizers in technology education are logical and can be of considerable assistance to planners of Tech Prep curriculum in designing, selecting, and organizing curriculum.

Proposition IV The current requirements for teacher certification do not permit adequate in-depth preparation in any one of the technology systems for teaching the more sophisticated content required in a high tech curriculum. Changing programs would require a review of CTTE/NCATE guidelines and state requirements for certification.

Proposition V Pre-service programs in conventional universities are not designed to prepare teachers for integrated curriculum concepts and would require considerable modification to accomplish that task. In-service teacher education has increasingly become a role of professional organizations and state departments of education.

Proposition VI Universities and colleges of education have not been consistently involved with the Tech Prep movement in the key roles of service, research or teaching. Reasons for not being involved range from quality of teacher education, privatization of curriculum development, to the concept of teacher-teaching-teacher models.

Proposition VII Tech Prep requires the preparation of students for work either directly after the program or advanced technical study. This concern by technology educators with work oriented curriculum or vocationalism limits the role of technology education in Tech Prep.

Proposition VIII The profession has not designed an effective senior high school technology education program and has no extensive record of success in the promotion of technology education at the advanced level.

Proposition IX Technology teachers must become more adept at understanding the politics of education and using political means to accomplish curriculum improvement and achieve implementation of program goals.

Summary. This paper started with a caveat that Tech Prep is probably not the most critical issue facing the profession but only one of many concepts being introduced into education. The more critical concepts are those of. **reforming** and **restructuring** of the education system.

Motivation and justification for reform and restructuring are in part housed in the various political agendas of presidents, senators and businessmen. However, it goes beyond politics. There is a deep seated feeling in the profession that all is not well in the house of education. This extends to the employer and to the parent in the local community. There is a tremendously strong ground-swell supporting the reform movement.

The middle fifty percent of the school population has not received the consideration; financial or otherwise, that has been given special education or college preparation. These students have benefitted least from the education tax dollar. In return they are expected to be productive workers. If this group continues to find little meaning in education, dropping out or turning off, the premise of a world-class work force will be lost.

And last, education is both blamed for failure and worshipped for cures which may go well beyond its intent or ability to deliver. However as we enter the concept of a global economy our success as a nation rests on education and our ability to continue to create, innovate and produce the products of a technological society.

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